



Leaf Photosynthetic Rates of Mature Holm Oak Trees Growing in Close Proximity to a Natural CO₂ Spring

Reference

Paoletti, E., Seufert, G., Della Rocca, G. and Thomsen, H. 2007. Photosynthetic responses to elevated CO₂ and O₃ in *Quercus ilex* leaves at a natural CO₂ spring. *Environmental Pollution* **147**: 516-524.

What was done

The authors measured rates of net photosynthesis during a two-week period in June of 2002 "at the end of the spring rains," when midday air temperatures rose above 40°C, in upper sunlit leaves of mature holm oak (*Quercus ilex* L.) trees growing close to (5 m), and further away from (130 m), a natural CO₂-emitting spring near Laiatico (Pisa, Italy), where the trees had experienced *lifetime exposure* to atmospheric CO₂ concentrations of approximately 1500 and 400 ppm, respectively.

What was learned

At the midpoint of the 14-day measurement period, the net photosynthetic rates of the leaves on the trees growing closest to the CO₂ spring were approximately 250% greater than those of the leaves on the trees growing 125 meters further away, where the air's CO₂ concentration was 1100 ppm less than it was in the vicinity of the trees nearest the spring.

What it means

In the words of the four Italian researchers who conducted the work, "the considerable photosynthetic stimulation at the very high CO₂ site suggests no photosynthetic down-regulation over long-term CO₂ enrichment." This real-world finding thus demonstrates the truly amazing potential for very large increases in the air's CO₂ content to greatly stimulate photosynthesis and significantly enhance the growth and development of earth's plants over the very-long-term.

Clearly, the *aerial fertilization effect* of atmospheric CO₂ enrichment is not a flash-in-the-pan phenomenon. It is here to stay ... and growing bigger by the day.